

QS-1 DRIVER =====

I was one of the lucky people to receive an early edition of the new Quad Serial Interface Card No.1.

The QS-1 was speedily constructed, despite a long wait for the DART's, then the fun started. How do you test and use an interface card for which no software exists? - You write your own, it can't be that difficult! So in my innocence I started to write my very first machine level program.

Step One - Hopper feed the J links into the positions suggested on the 'DRAFT ONLY' data sheet 18/11/87 and workout which links are required where for your choice of ports (no Interak Standard) and card.

Step Two - Understand the Port /Card /DART /8116 decoding. I referred to my wiewhty tomes of knowledge, all available examples had 2 ports for the DART, 1 port for a CTC and no card select. David Parkins gave me the required hints and suggestions to put me on the right tracks and having cracked the method it is reasonably straight-forward.

HINT =====

Port decoding - Bits 0 to 2 define P0 to P7.
Bits 3 to 7 set by links, Base Address 0-248 (F8h)

Card select - Bits 3 to 7 define card to use.
Bits 0 to 2 define DART1/2 or 8116 No1/2.

0 1 2	3 4 5 6 7	
!-----!	!-----!	
	0 - 35	
SIO/8116	Card	
v	-----	
000 = SIO/DART No1		v
001 = SIO/DART No2	Remember to rotate the five card	
100 = 8116 No1	bits forward three places when	
101 = 8116 NO2	calculating byte value.	

Step Three - Start communicating with the interface. Reach for the DART data sheet, not written for the unsure.

Enter stage left PRINT.COM Version 1.00 using the very clever autoenable features available. Program asks for a file, loads it into memory and sends the data using RTS/CTS handshaking. Works OK on my printer, I feel very pleased - Job done send a copy to David.

Returned quickly with a list of missing features and a hint that autoenables weren't a good idea, thanks David.

Using autoenables the CTS pin controls the DART transmitter and DCD the reciever, this clearly restricts the handshaking to these two lines only.

Back to work again.

The main change is to the handshaking options offered, the routines firstly hold RTS and DTR outputs 'high' and test CTS and DCD. The program loops until either of these inputs goes 'high' indicating that a printer is connected. If your printer can't do this the program can be fooled by linking on the QS-1 board (see PRINT.COM help file).

Having decided that the printer is connected the program branches into the selected routine :-

DTR/DSR - tests DCD, when 'high' sends data to printer, retests after each byte and stops sending when 'low'. The bit is continually tested until it goes 'high' or is aborted.

RTS/CTS - as for DTR except that CTS is tested.

XON/XOFF - reads input from printer and tests for XOFF character, if found routines inputs until XON recieved or is aborted.

ETX/ACK - sends one byte of data followed by an ETX character. The routine expects to receive a ACK character. Again the routine will loop until the ACK is recieved or is aborted.

PRINT.COM VERSION 1.10 a fully menu driven printer driver routine. Features include default parameters for no nonsense printing - PRINT filename, 16K buffer, user selectable outputs, baud rate and handshaking.

QS-1 outputs 1 to 4

Baud rates 0 to 19200

Hand-shaking RTS/CTS, DTR/DSR, XON/XOFF, ETX/ACK

Alas David's never satisfied, more additions

Firstly an opportunity in the setup option to enter startup codes for your printer, clear buffer, home head, special fonts,

Then control codes in the text to give special features like underlining, NLQ, double width printing,

Finally a little addition of my own, four RSX's to enable WS to drive the QS-1

Interested ? Like a copy ? Contact David Parkins, Greenbank Electronics

JOHN.

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QS-1 CONTROL PROG

;JWB 01/01/89
;
; 27/12/88
;
; 25/11/88

ORG 0100H

PORT0	EQU 00H	; BASE PORT ADDRESS
CARD0	EQU 00H	; BASE CARD
BDOS	EQU 5	; BDOS ENTRY POINT
CONIN	EQU 1	; CHARACTER INPUT FUNCTION
CONOUT	EQU 2	; CHARACTER OUTPUT FUNCTION
CONST	EQU 0BH	; CONSOLE STATUS
STRING	EQU 9	; STRING OUTPUT FUNCTION
FCB	EQU 05CH	; FILE CONTROL BLOCK ADDR
OPEN	EQU 0FH	; FILE OPEN FUNCTION
CLOSE	EQU 10H	; FILE CLOSE FUNCTION
READ	EQU 14H	; FILE READ FUNCTION
COUNT	EQU 2CH	; BYTES TO READ FUNCTION
SETDMA	EQU 1AH	; BUFFER LOCATE FUNCTION
CONSOLE	EQU 0AH	; READ CONSOLE FUNCTION
BUFFSIZ	EQU 16	; MEMORY BUFFER SIZE IN 'K'
RESET	EQU 00H	; BDOS RESET FUNCTION
XON	EQU 11H	; CTRL Q
XOFF	EQU 13H	; CTRL S
ETX	EQU 03H	; END OF TEXT CTRL C
ACK	EQU 06H	; ACKNOWLEDGE
ESC	EQU 1BH	; ESC = EXIT
CLR	EQU 1AH	; ^Z = CLEAR SCREEN/EOF
LF	EQU 0AH	; LINEFEED
CR	EQU 0DH	; CARRIAGE RETURN

PORTSET: LD A,PORT0
LD (P0),A
INC A
LD (P1),A
INC A
LD (P2),A
INC A
LD (P3),A
ADD A,04
LD (P7),A

CARDSET: LD A,CARD0
RLCA
RLCA
RLCA
LD (D0),A
INC A
LD (D1),A
INC A
INC A
INC A
LD (B0),A
INC A
LD (B1),A


```

START:  LD SP,STACK          ; USE LOCAL STACK
        LD A,'4'            ; DEFAULT POINTER
        LD (DEV),A
        LD A,'N'            ; NO PRINTER SETUP
        LD (CODE),A

AUTO:   LD A,(FCB+1)
        CP '?'              ; SHOW DEFAULTS
        JP NZ,AUTOP
        CALL DEF
        CALL CONSEL
        CALL CLEAR
        JP EXIT

AUTOP:  CP ' '              ; NOT AUTO-PRINT
        CALL DEF
        JP Z,MENU
        LD DE,LOGO
        CALL MESSPRT
        CALL INITP          ; DO AUTO-PRINT
        CALL SETBAUD
        JP PRINT

MENU:   CALL CLEAR
        LD DE,LOGO
        CALL MESSPRT
        LD DE,MENUMSG
        CALL MESSPRT
        CALL CHRIN
        CP 96
        CALL P,CAPS
        CP 'S'              ; SETUP
        JP Z,PATH
        CP 'P'              ; PRINT
        CALL Z,FILE
        CP ESC              ; ESCAPE TO SYSTEM
        JP Z,EXIT
        CP CR
        JP Z,HELP
        JP MENU

FILE:   CALL INITP
        JP PRFILE

PATH:   CALL CLEAR
        LD DE,PATHMSG
        CALL MESSPRT
        CALL CHRIN
        CP ESC
        JP Z,MENU
        CP '4'
        JP P,PATH           ; ABOVE 3?
        CP '0'
        JP M,PATH           ; LESS THAN 0?

GETCON: LD (DEV),A          ; GET DEVICE No
        CALL BAUDSEL        ; SELECT BAUD RATE
        CALL CONVERT        ; CONVERT TO DECIMAL

```

```

ROTATE:  LD A,(TEMP)
          RLCA
          RLCA
          RLCA
          RLCA
          LD B,A
          LD A,(TEMP)
          OR B
          LD (TBRD),A          ; A CONTAINS Tx/Rx BAUD

```

```

PROTO:   CALL CLEAR
          LD DE,PROTMSG
          CALL MESSPRT
          CALL CHRIN
          CP 96
          CALL P,CAPS
          CP 'R'
          JP Z,PRTS
          CP 'D'
          JP Z,PDTR
          CP 'X'
          JP Z,PXON
          CP 'E'
          JP Z,PENQ
          JP PROTO

```

```

PRTS:    LD A,'R'
          LD (PROT),A
          CALL ESCMENU
          CALL CONSEL
          JP MENU

```

```

PDTR:    LD A,'R'
          LD (PROT),A
          CALL ESCMENU
          CALL CONSEL
          JP MENU

```

```

PXON:    LD A,'X'
          LD (PROT),A
          CALL ESCMENU
          CALL CONSEL
          JP MENU

```

```

PENQ:    LD A,'E'
          LD (PROT),A
          CALL ESCMENU
          CALL CONSEL
          JP MENU

```

```

ESCMENU: CALL CLEAR
          LD DE,ESCMG
          CALL MESSPRT
          CALL CHRIN
          CP 96
          CALL P,CAPS
          LD (CODE),A
          CP 'N'
          RET Z

```

```

ESCODE:  LD DE,CODMSG
          CALL MESSPRT
          LD HL,IPSTR           ; FILE INPUT BUFFER
          LD A,20              ; MAX No CHARACTERS
          LD (HL),A
          INC HL
          LD A,00              ; INITIAL No CHARACTERS
          LD (HL),A
          LD C,CONSOLE         ; READ CONSOLE
          LD DE,IPSTR          ; FILE INPUT BUFFER
          CALL BDOS
          LD HL,IPSTR+2
          LD DE,ESCSTR

```

```

CODELP:  LD A,(HL)
          CP '&'
          RET Z
          CP 96
          CALL P,CAPS
          CALL CONVERT
          RLCA
          RLCA
          RLCA
          RLCA
          LD (ESC1),A
          INC HL
          LD A,(HL)
          CP 96
          CALL P,CAPS
          CALL CONVERT
          LD (ESC2),A
          LD A,(ESC1)
          LD B,A
          LD A,(ESC2)
          ADD A,B
          LD (DE),A
          INC DE
          INC HL
          JP CODELP

```

```

INITP:   LD A,(DEV)
          CP '0'
          JP Z,D1A
          CP '1'
          JP Z,D1B
          CP '2'
          JP Z,D2A
          CP '3'
          JP Z,D2B

```

```

DEF:     LD A,'1'             ; DEVICE 1 FOR CONSEL
          LD (DEV),A
DRT:     LD A,(D0)            ; FIRST DART
          LD (DART),A
BRD:     LD A,(B0)            ; FIRST B116
          LD (BAUD),A
PRT:     LD A,(P3)            ; CHANNEL A CTRL
          LD (CHAB),A
BRT:     LD A,0EEH            ; 9600 BAUD
          LD (TBRD),A

```

```

PRO:      LD A, 'R'
          LD (PROT), A      ; CTS/DSR PROTOCOL
          RET

D1A:      LD A, (D0)
          LD (DART), A
          LD A, (B0)
          LD (BAUD), A
          LD A, (P1)      ; DART0 A CTRL PORT
          LD (CHAB), A
          JP SETBAUD

D1B:      LD A, (D0)
          LD (DART), A
          LD A, (B0)
          LD (BAUD), A
          LD A, (P3)      ; DART0 B CTRL PORT
          LD (CHAB), A
          JP SETBAUD

D2A:      LD A, (D1)
          LD (DART), A
          LD A, (B1)
          LD (BAUD), A
          LD A, (P1)      ; DART1 A CTRL PORT
          LD (CHAB), A
          JP SETBAUD

D2B:      LD A, (D1)
          LD (DART), A
          LD A, (B1)
          LD (BAUD), A
          LD A, (P3)      ; DART1 B CTRL PORT
          LD (CHAB), A

SETBAUD:  LD A, (P7)      ; SPECIAL CONFIG PORT
          LD C, A
          LD A, (BAUD)
          OUT (C), A      ; SELECT BAUD0/1
          LD A, (P0)
          LD C, A
          LD A, (TBRD)
          OUT (C), A      ; 2x4 BIT WORD TO 8116

SETDART:  LD A, (P7)
          LD C, A
          LD A, (DART)
          OUT (C), A      ; LATCH U17, U22
          LD A, (CHAB)    ; A OR B
          LD C, A
          LD A, 18H
          OUT (C), A      ; CHANNEL RESET
          LD A, 04H
          OUT (C), A      ; WR4
          LD A, 044H
          OUT (C), A      ; X16 CLK, 1 STOP BIT
          LD A, 03H
          OUT (C), A      ; WR3
          LD A, 0C1H
          OUT (C), A      ; 8 RX BITS, RX ENABLE

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REG5:  LD A,05H
        OUT (C),A      ; WR5
        LD A,0EAH      ; DTR, RTS ON AND
        OUT (C),A      ; 8 TX BITS, TX ENABLE
        LD A,01H
        OUT (C),A      ; WR1
        LD A,00H
        OUT (C),A      ; DISABLE INTERRUPT
        RET

PRTFILE: CALL CLEAR      ; CLEAR SCREEN
        LD B,15
        LD DE,BUFF-15    ; BUFFER TO FLUSH
        LD HL,FLUSH      ; LOCATION OF BLANK FILE
        LDIR
        LD C,STRING
        LD DE,FILMSG      ; ASK FOR FILENAME
        CALL BDOS
        LD HL,BUFF-15    ; FILE INPUT BUFFER
        LD A,20          ; MAX No CHARACTERS
        LD (HL),A
        INC HL
        LD A,00          ; INITIAL No CHARACTERS
        LD (HL),A
        LD C,CONSOLE      ; READ CONSOLE
        LD DE,BUFF-15    ; FILE INPUT BUFFER
        CALL BDOS
        LD HL,BUFF-12
        LD DE,FCB
        LD A,(HL)
        CP ':'
        JP NZ,NODRV
        DEC HL            ; INC HL PAST COLON
        LD A,(HL)
        LD (DE),A
        INC HL
        INC HL
        INC DE
        JP MOVE

NODRV:  INC DE
        DEC HL

MOVE:   LD B,9
        LD A,(HL)        ; FIRST LETTER OF NAME
        CP '.'           ; IS THIS THE END ?
        JP Z,TYPE
        CP ' '           ; BLANKS IN FILENAME ?
        JP Z,PRINT
        CP 96
        CALL P,CAPS
        LD (DE),A        ; INTO FCB
        INC HL
        INC DE
        DJNZ MOVE
        JP PRINT

TYPE:   INC HL
        LD DE,FCB+9
        LD B,3

```

```

FTP:      LD A,(HL)
          CP 96
          CALL P,CAPS
          LD (DE),A      ; LOAD FILETYPE TO FCB
          INC HL
          INC DE
          DJNZ FTP

PRINT:    XOR A
          LD (FCB+32),A   ; RECORD No 00
          LD (FCB+12),A   ; EXTENT 00
          LD C,OPEN       ; OPEN FILE FUNCTION
          LD DE,FCB       ; POINT TO FILE NAME
          CALL BDOS
          CP 255          ; 255 IF NO FILE FOUND
          JP Z,NOFILE
          CALL CRLF
          CALL CRLF

SETUP:    LD C,SETDMA     ; SET DMA TO BUFF
          LD DE,BUFF
          CALL BDOS
          LD C,COUNT      ; RECORD COUNT
          LD E,BUFFSIZ*8  ; No RECORDS TO FILL BUFFER
          CALL BDOS
          LD C,READ       ; READ FILE
          LD DE,FCB
          CALL BDOS
          CP 00           ; 0 IF FILE NOT FINISHED
          JP Z,NOTALL
          CALL OUTPUT
          LD C,STRING
          LD DE,PRTEEND
          CALL BDOS
          CALL CHRIN
          LD A,(CHAB)
          LD C,A
          LD A,18H
          OUT (C),A       ; CHANNEL RESET
          JP EXIT         ; BACK TO SYSTEM

NOTALL:   CALL OUTPUT     ; ROUTINE FOR NOT
          JP SETUP        ; LAST RECORD

NOFILE:   LD C,STRING
          LD DE,NOFMSG     ; SAY NO FILE
          CALL BDOS
          CALL CHRIN
          JP EXIT

OUTPUT:   LD C,STRING
          LD DE,PRMSG      ; SAY PRINTING
          CALL BDOS
          LD A,(CODE)
          CP 'Y'
          CALL Z,PRTSET
          LD HL,BUFF

PROTOCOL: LD A,(PROT)

```

```

CP 'R'
JP Z,RTSDTR
CP 'X'
JP Z,XONXOFF
CP 'E'
JP Z,ETXACK
JP EXIT

```

;***** PRINTER DRIVERS *****

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RTSDTR:  CALL ESCAPE
         CALL TXBUFF

```

```

RRESET:  CALL ESCAPE
         LD A,(CHAB)
         LD C,A
         LD A,00H
         OUT (C),A           ; WR0
         LD A,10H
         OUT (C),A           ; RESET EXT/STATUS INT
         IN A,(C)
         BIT 5,A             ; TEST FOR CTS
         JP NZ,RDATA
         BIT 3,A             ; TEST FOR DCD/DSR
         JP Z,RRESET

```

```

RDATA:   LD A,(CHAB)
         DEC A
         LD C,A             ; DATA PORT
         LD A,(HL)          ; FILE BUFFER
         CP 1AH
         RET Z
         CP 5EH
         CALL Z,SPECIAL
         OUT (C),A
         INC HL              ; INC MEMORY POINTER
         LD A,H
         LD BC,BUFFEND
         CP B                ; BUFFER END?
         JP NZ,RTSDTR
         RET

```

;***** END OF RTS/CTS & DTR/DSR ROUTINE *****

```

XONXOFF: CALL ESCAPE
         CALL TXBUFF

```

```

XRESET:  CALL ESCAPE
         LD A,(CHAB)
         LD C,A
         LD A,00H
         OUT (C),A           ; WR0
         LD A,10H
         OUT (C),A           ; RESET EXT/STATUS INT
         IN A,(C)
         BIT 5,A             ; TEST FOR CTS
         JP NZ,XDATA
         BIT 3,A             ; TEST FOR DCD/DSR
         JP Z,XRESET

```

```

XDATA:  LD A,(CHAB)
        DEC A
        LD C,A           ; DATA PORT
        IN A,(C)
        CP XOFF          ; XOFF SENT
        JP Z,XHAND       ; WAIT FOR XON
        LD A,(HL)        ; FILE BUFFER
        CP 1AH
        RET Z
        CP 5EH
        CALL Z,SPECIAL
        OUT (C),A
        INC HL           ; INC MEMORY POINTER
        LD A,H
        LD BC,BUFFEND
        CP B             ; BUFFER END?
        JP NZ,XONXOFF
        RET

```

```

XHAND:  CALL ESCAPE
        LD A,(CHAB)
        DEC A
        LD C,A
        IN A,(C)
        AND 7FH
        CP XON
        JP Z,XONXOFF
        JP XHAND

```

;***** END OF XON/XOFF ROUTINE *****

```

ETXACK: CALL ESCAPE
        CALL TXBUFF

```

```

ERESET: CALL ESCAPE
        LD A,(CHAB)
        LD C,A
        LD A,00H
        OUT (C),A        ; WR0
        LD A,10H
        OUT (C),A        ; RESET EXT/STATUS INT
        IN A,(C)
        BIT 5,A          ; TEST FOR CTS
        JP NZ,EDATA
        BIT 3,A          ; TEST FOR DCD/DSR
        JP Z,ERESET

```

```

EDATA:  LD A,(CHAB)
        DEC A
        LD C,A
        LD A,(HL)       ; FILE BUFFER
        CP 1AH
        RET Z
        CP 5EH
        CALL Z,SPECIAL
        OUT (C),A
        INC HL          ; INC MEMORY POINTER
        LD A,H
        LD BC,BUFFEND

```



```

        CP B                ; BUFFER END?
        RET Z

EETX:   CALL ESCAPE
        CALL TXBUFF
        DEC C                ; DATA PORT
        LD A,ETX
        OUT (C),A           ; SEND ETX TO PRINTER

EACK:   IN A,(C)
        AND 7FH
        CP ACK                ; ACKNOWLEDGE FROM PRINTER
        JP NZ,EETX
        JP ETXACK

```

;***** END OF EXT/ACK ROUTINE *****

```

FRTSET: LD A,'N'
        LD (CODE),A
        LD HL,ESCSTR

```

```

SETLP:  CALL ESCAPE
        CALL TXBUFF

```

```

ESCLP:  LD A,(HL)
        CP '#'
        RET Z
        DEC C
        OUT (C),A
        INC HL
        JP SETLP

```

```

SPECIAL: INC HL
        LD A,(HL)
        CP 'E'
        JP Z,COMP
        CP 'R'
        JP Z,GROW
        CP 'Q'
        JP Z,DOUB
        CP 'W'
        JP Z,HALF
        CP 'A'
        JP Z,ALT
        CP 'N'
        JP Z,NORM
        CP 'S'
        JP Z,UNDE
        CP 'T'
        JP Z,NOUN
        DEC HL
        LD A,(HL)
        RET

```

```

NEXT:   LD A,(HL)
        CP 5EH
        JP Z,SPECIAL
        RET

```

```

COMP:   LD DE,CPE

```

PUSH DE
 COMPLP: CALL ESCAPE
 CALL TXBUFF
 COUTLP: POP DE
 LD A,(DE)
 CP '#'
 JP Z,NEXT
 DEC C
 OUT (C),A
 INC DE
 PUSH DE
 JP COMPLP
 GROW: LD DE,CPR
 PUSH DE
 GROWLP: CALL ESCAPE
 CALL TXBUFF
 GOUTLP: POP DE
 LD A,(DE)
 CP '#'
 JP Z,NEXT
 DEC C
 OUT (C),A
 INC DE
 PUSH DE
 JP GROWLP
 DOUB: LD DE,CPQ
 PUSH DE
 DOUBLP: CALL ESCAPE
 CALL TXBUFF
 DOUTLP: POP DE
 LD A,(DE)
 CP '#'
 JP Z,NEXT
 DEC C
 OUT (C),A
 INC DE
 PUSH DE
 JP DOUBLP
 HALF: LD DE,CPW
 PUSH DE
 HALFLP: CALL ESCAPE
 CALL TXBUFF
 HOUTLP: POP DE
 LD A,(DE)
 CP '#'
 JP Z,NEXT
 DEC C
 OUT (C),A
 INC DE

	PUSH DE
	JP HALFLP
ALT:	LD DE,CPA PUSH DE
ALTLP:	CALL ESCAPE CALL TXBUFF
AOUTLP:	POP DE LD A,(DE) CP '#' JP Z,NEXT DEC C OUT (C),A INC DE PUSH DE JP ALTLP
NORM:	LD DE,CPN PUSH DE
NORMLP:	CALL ESCAPE CALL TXBUFF
NOUTLP:	POP DE LD A,(DE) CP '#' JP Z,NEXT DEC C OUT (C),A INC DE PUSH DE JP NORMLP
UNDE:	LD DE,CPS PUSH DE
UNDELP:	CALL ESCAPE CALL TXBUFF
UOUTLP:	POP DE LD A,(DE) CP '#' JP Z,NEXT DEC C OUT (C),A INC DE PUSH DE JP UNDELP
NOUN:	LD DE,CPT PUSH DE
NOUNLP:	CALL ESCAPE CALL TXBUFF
OOUTLP:	POP DE LD A,(DE) CP '#'

```

JP Z,NEXT
DEC C
OUT (C),A
INC DE
PUSH DE
JP NOUNLP

```

```

TXBUFF:  CALL ESCAPE
          LD A,(CHAB)
          LD C,A
          IN A,(C)
          BIT 2,A           ; TEST TX BUFFER EMPTY
          RET NZ
          JP TXBUFF

```

```

CONSEL:  CALL CLEAR
          LD A,(DEV)       ; GET DEVICE No
          LD (PCON+25),A   ; WRITE TO STRING
          LD C,STRING
          LD DE,PCON
          CALL BDOS
          LD HL,DBRD
          LD A,(TBRD)
          CALL SELB
          LD C,STRING
          LD A,(DBRD)      ; BYTE COUNT TO SELECTION
          LD DE,PCBD      ; BASE STRING TABLE
          ADD A,E
          LD E,A           ; SET STRING POINTER
          CALL BDOS
          LD C,STRING
          LD DE,PCEND
          CALL BDOS
          LD C,CONIN
          CALL BDOS
          RET

```

```

BAUDSEL: CALL CLEAR
          LD DE,BAUDMSG
          CALL MESSPRT
          CALL CHRIN
          CP 96
          CALL P,CAPS
          CP 'G'           ; ABOVE F?
          JP P,BAUDSEL
          CP '0'           ; BELOW 0?
          JP M,BAUDSEL
          RET

```

```

SELB:    CP 00H           ; SEARCH FOR BAUD RATE
          LD (HL),0
          RET Z
          CP 011H
          LD (HL),5
          RET Z
          CP 022H
          LD (HL),10
          RET Z
          CP 033H
          LD (HL),15

```

```

RET Z
CP 044H
LD (HL),20
RET Z
CP 055H
LD (HL),25
RET Z
CP 066H
LD (HL),30
RET Z
CP 077H
LD (HL),35
RET Z
CP 088H
LD (HL),40
RET Z
CP 099H
LD (HL),45
RET Z
CP 0AAH
LD (HL),50
RET Z
CP 0BBH
LD (HL),55
RET Z
CP 0CCH
LD (HL),60
RET Z
CP 0DDH
LD (HL),65
RET Z
CP 0EEH
LD (HL),70
RET Z
CP 0FFH
LD (HL),75
RET Z
LD (HL),81
RET

```

```

CONVERT: LD (TEMP),A      ; CHANGE ASCII TO DECIMAL
          CP 3AH           ; CONVERT A LETTER?
          JP P,LETTER

```

```

DIGIT: LD A,(TEMP)
        SUB 30H           ; ASCII - 30H = No
        LD (TEMP),A
        RET

```

```

LETTER: LD A,(TEMP)
        SUB 37H           ; ASCII - 37H = No
        LD (TEMP),A
        RET

```

```

HELP: CALL CLEAR
       LD DE,HELPMMSG
       CALL MESSPRT
       CALL CHRIN
       CP 'B'
       JP Z,MENU

```

CP ESC
JP Z,MENU

H1: CALL CLEAR
LD DE,HELP1
CALL MESSPRT
CALL CHRIN
CP 'B'
JP Z,HELP
CP ESC
JP Z,MENU

H2: CALL CLEAR
LD DE,HELP2
CALL MESSPRT
CALL CHRIN
CP 'B'
JP Z,H1
CP ESC
JP Z,MENU

H3: CALL CLEAR
LD DE,HELP3
CALL MESSPRT
CALL CHRIN
CP 'B'
JP Z,H2
CP ESC
JP Z,MENU

H4: CALL CLEAR
LD DE,HELP4
CALL MESSPRT
CALL CHRIN
CP 'B'
JP Z,H3
CP ESC
JP Z,MENU

H5: CALL CLEAR
LD DE,HELP5
CALL MESSPRT
CALL CHRIN
CP 'B'
JP Z,H4
CP ESC
JP Z,MENU

H6: CALL CLEAR
LD DE,HELP6
CALL MESSPRT
CALL CHRIN
CP 'B'
JP Z,H5
CP ESC
JP Z,MENU

H7: CALL CLEAR
LD DE,HELP7
CALL MESSPRT

```

CALL CHRIN
CP 'B'
JP Z,H6
CP ESC
JP Z,MENU

H8:    CALL CLEAR
        LD DE,HELP8
        CALL MESSPRT
        CALL CHRIN
        CP 'B'
        JP Z,H7
        CP ESC
        JP Z,MENU

H9:    CALL CLEAR
        LD DE,HELP9
        CALL MESSPRT
        CALL CHRIN
        CP 'B'
        JP Z,H8
        CP ESC
        JP Z,MENU

HA:    CALL CLEAR
        LD DE,HELPA
        CALL MESSPRT
        CALL CHRIN
        CP 'B'
        JP Z,H9
        JP MENU

CHRIN:  LD C,CONIN
        CALL BDOS
        RET

CAPS:   SUB 32
        RET

CRLF:   LD C,CONOUT
        LD E,CR
        CALL BDOS
        LD C,CONOUT
        LD E,LF
        CALL BDOS
        RET

MESSPRT: LD C,STRING
        CALL BDOS
        RET

CLEAR:   LD C,CONOUT
        LD E,CLR
        CALL BDOS
        CALL CRLF
        RET

ESCAPE:  EXX
        LD C,CONST
        CALL BDOS

```

```

CP 00H
JP Z,ESCEND
LD C,CONIN
CALL BDOS
CP ESC
JP Z,EXIT

```

```

ESCEND:  EXX
          RET

```

```

ILLE:    CALL CLEAR
          LD DE,ILLEMSG
          CALL MESSPRT
          CALL CHRIN

```

```

EXIT:    CALL CLEAR
          LD A,(P7)
          LD C,A
          LD A,(DART)
          OUT (C),A           ; LATCH U17, U22
          LD A,(CHAB)         ; A OR B
          LD C,A
          LD A,18H
          OUT (C),A           ; CHANNEL RESET
          LD C,SETDMA          ; DMA RESTORED
          LD DE,0080H
          CALL BDOS
          LD C,COUNT           ; SECTOR COUNT=1
          LD E,1
          CALL BDOS
          LD C,RESET           ; RESET BDOS
          CALL BDOS

```

```

ILLEMSG:  DEFB CR,LF,LF,'  INVALID PROGRAM FILE - COPYRIGHT VIOLATION ','$'

```

```

LOGO:     DEFB CR,LF
          DEFB '  QS1 Copyright (C) VERSION 3.00 '

```

```

NAME:     DEFB 'J.W.BOWES 1988',CR,LF,LF,'$'

```

```

MENUMSG:  DEFB '  Printer driver for the Interak QS-1 Quad Serial',CR,LF
          DEFB '  Interface card.',CR,LF,LF,LF
          DEFB '      SETUP PRINTER OUTPUT PARAMETERS (S)',CR,LF,LF
          DEFB '      SEND FILE TO SELECTED PRINTER (P)',CR,LF
          DEFB LF,LF,LF,LF,LF,LF,LF,LF,LF,LF,LF,LF
          DEFB '      RETURN - HELP          ESC - EXIT',CR,LF
          DEFB '      ','$'

```

```

PATHMSG:  DEFB CR,LF,'
          DEFB '      SELECTION OF OUTPUT PATH ',CR,LF,LF,LF
          DEFB '      DEVICE      SELECTION',CR,LF
          DEFB '      *****      *****',CR,LF,LF
          DEFB '      RS00 - Printer 0 ----- (0)',CR,LF,LF
          DEFB '      RS01 - Printer 1 ----- (1)',CR,LF,LF
          DEFB '      RS02 - Printer 2 ----- (2)',CR,LF,LF
          DEFB '      RS03 - Printer 3 ----- (3)',CR,LF,LF,LF,LF
          DEFB '      ESC TO RETURN TO THE PREVIOUS MENU',CR,LF,LF,LF,'$'

```

```

BAUDMSG:  DEFB '      TRANSMIT BAUD RATE ',CR,LF
          DEFB '      ***** ',CR,LF,LF,LF
          DEFB '      50      ----- (0) ',CR,LF

```


DEFB	75	-----	(1)	',CR,LF
DEFB	110	-----	(2)	',CR,LF
DEFB	134	-----	(3)	',CR,LF
DEFB	150	-----	(4)	',CR,LF
DEFB	300	-----	(5)	',CR,LF
DEFB	600	-----	(6)	',CR,LF
DEFB	1200	-----	(7)	',CR,LF
DEFB	1800	-----	(8)	',CR,LF
DEFB	2000	-----	(9)	',CR,LF
DEFB	2400	-----	(A)	',CR,LF
DEFB	3600	-----	(B)	',CR,LF
DEFB	4800	-----	(C)	',CR,LF
DEFB	7200	-----	(D)	',CR,LF
DEFB	9600	-----	(E)	',CR,LF
DEFB	19200	-----	(F)	',CR,LF,LF,\$'

PROTOMSG: DEFB CR,LF,LF

DEFB ' Terminal/Printer Handshaking',CR,LF
 DEFB ' =====',CR,LF,LF,LF
 DEFB ' RTS/CTS ----- (R)',CR,LF,LF
 DEFB ' DTR/DSR ----- (D)',CR,LF,LF
 DEFB ' XON/XOFF ----- (X)',CR,LF,LF
 DEFB ' ETX/ACK ----- (E)',CR,LF,LF,LF,\$'

ESCMSG: DEFB ' ARE SPECIAL CODES REQUIRED BY YOUR PRINTER BEFORE',CR,LF
 DEFB ' PRINTING BEGINS ? (Y/N) ', '\$'

CODMSG: DEFB CR,LF,LF
 DEFB ' ENTER THE CODE SEQUENCE IN HEXADECIMAL, OMIT THE "H"',CR,LF
 DEFB ' AND ALL SPACES. LEADING ZEROES REQUIRED :-',CR,LF,LF,\$'

FLUSH: DEFB ' '

FILMSG: DEFB ' SYNTAX [DRV:] FILENAME.FILETYPE',CR,LF,LF
 DEFB ' ESC to STOP',CR,LF,LF,LF
 DEFB ' FILE TO PRINT..',CR,LF,LF,\$'

NOFMSG: DEFB CR,LF,LF,' FILE NOT FOUND ON SPECIFIED DISC OR FILENAME INVALID',CR,LF,LF,
 \$'

PRTMSG: DEFB ' SENDING TO PRINTER',CR,LF,\$'

PRTEND: DEFB LF,LF,' TRANSFER FINISHED.',CR,LF,LF,LF
 DEFB ' ANY KEY', '\$'

HELPMMSG: DEFB CR,LF
 DEFB ' NAMING CONVENTIONS',CR,LF,' =====',CR,LF,LF
 DEFB ' Lines on the RS232 25-Way connector have been defined',CR,LF
 DEFB ' by Greenbank Electronics on their QS-1 circuit diagram',CR,LF,LF
 DEFB ' Where a signal passes down a particular line, in',CR,LF
 DEFB ' either direction, that signal adopts the name of the',CR,LF
 DEFB ' line. eg. signal on line 6 is always DSR',CR,LF
 DEFB ' signal on line 4 is always RTS',CR,LF
 DEFB LF,LF,LF,LF,LF,LF,' "B" - PREVIOUS PAGE "ESC" - MENU',CR,LF
 DEFB ' ANY OTHER KEY - NEXT PAGE', '\$'

HELP1: DEFB CR,LF
 DEFB ' PORTS',CR,LF,' =====',CR,LF,LF
 DEFB ' The program as supplied is initialised for ports',CR,LF
 DEFB ' 00h to 07h on card 00h.',CR,LF,LF

```

DEFB ' These values can be changed in the program file',CR,LF,LF
DEFB ' Only one entry requires changing to alter port',CR,LF
DEFB ' address - BASE PORT, BASE CARD must be changed',CR,LF
DEFB ' to select other cards.',CR,LF,LF
DEFB ' Cards 0 to 31 can be programmed onto the QS-1.',CR,LF,LF
DEFB LF,LF,LF,' "B" - PREVIOUS PAGE "ESC" - MENU',CR,LF
DEFB ' ANY OTHER KEY - NEXT PAGE','$'

```

```

HELP2: DEFB ' HANDSHAKING',CR,LF,' =====',CR,LF,LF
DEFB ' PRINT.COM supports the following handshaking',CR,LF
DEFB ' protocols;',CR,LF,LF
DEFB ' RTS/CTS requires RTS from printer to CTS on pin 5',CR,LF,LF
DEFB ' DTR/DSR requires DTR from printer to DSR on pin 6',CR,LF,LF
DEFB ' Signal crossing can be done by links on the QS-1',CR,LF
DEFB ' board, a crossed printer cable or a Patch Box.',CR,LF
DEFB ' eg. On QS-1',CR,LF,LF
DEFB ' J1 - P6, 7, 8, 9, 10, 11 in DCE position and',CR,LF
DEFB ' P3, 4, 5 in DTE position.',CR,LF,LF
DEFB ' More on next page.',CR,LF
DEFB LF,' "B" - PREVIOUS PAGE "ESC" - MENU',CR,LF
DEFB ' ANY OTHER KEY - NEXT PAGE','$'

```

```

HELP3: DEFB CR,LF
DEFB ' XON/XOFF code 11h represents ready to receive and',CR,LF
DEFB ' code 13h represents stop sending.',CR,LF,LF
DEFB ' XOFF is sent by the printer when it cannot',CR,LF
DEFB ' accept data.',CR,LF
DEFB ' XON is sent when transmission can resume.',CR,LF,LF
DEFB ' ETX/ACK Computer sends ETX (03h) to the printer at',CR,LF
DEFB ' the end of a string of characters.',CR,LF
DEFB ' Printer sends ACK (06h) when all these have',CR,LF
DEFB ' been printed and it is ready for more data.',CR,LF,LF
DEFB ' The routines search for CTS then, if CTS is',CR,LF
DEFB ' not found DSR. One of these signals must be',CR,LF
DEFB ' present to enable the driver.',CR,LF
DEFB ' If your printer cannot provide either signal',CR,LF
DEFB ' fit vertical links on the QS-1 board.',CR,LF
DEFB ' (RTS to CTS, DTR to DSR)',CR,LF,LF
DEFB LF,' "B" - PREVIOUS PAGE "ESC" - MENU',CR,LF
DEFB ' ANY OTHER KEY - NEXT PAGE','$'

```

```

HELP4: DEFB ' PRINTER SET-UP CODES',CR,LF,' =====',CR,LF,LF
DEFB ' Your printer may have the facility to print in',CR,LF
DEFB ' different fonts, double width, compressed mode',CR,LF
DEFB ' near letter quality, etc...',CR,LF
DEFB ' These other modes can be selected by the PRINT',CR,LF
DEFB ' program. If you chose the SELECT option the',CR,LF
DEFB ' fourth screen asks if any special codes are',CR,LF
DEFB ' required, answer "Y".',CR,LF
DEFB ' Enter codes in hexadecimal, no spaces between',CR,LF
DEFB ' codes, no "h". Ten codes maximum.',CR,LF,LF
DEFB ' e.g 8 coloumn left hand margin = 1Bh 6Ch 08h',CR,LF
DEFB ' 4 coloumn right hand margin = 1Bh 51h 04h',CR,LF,LF
DEFB ' Enter 1B6C081B5104[CR]',CR,LF,LF,LF
DEFB ' More on next page.',CR,LF
DEFB LF,' "B" - PREVIOUS PAGE "ESC" - MENU',CR,LF
DEFB ' ANY OTHER KEY - NEXT PAGE','$'

```

```

HELP5: DEFB ' SPECIALITY PRINTING',CR,LF,' =====',CR,LF,LF
DEFB ' The following file markers give special printing',CR,LF

```

```

DEFB ' modes :-',CR,LF,LF
DEFB ' ^A Near letter quality ..... ON.',CR,LF
DEFB ' ^N Near letter quality ..... OFF.',CR,LF,LF
DEFB ' ^E Compressed mode ..... ON.',CR,LF
DEFB ' ^R Compressed mode ..... OFF.',CR,LF,LF
DEFB ' ^Q Double width mode ..... ON.',CR,LF
DEFB ' ^W Double width mode ..... OFF.',CR,LF,LF
DEFB ' ^S Underlining mode ..... ON.',CR,LF
DEFB ' ^T Underlining mode ..... OFF.',CR,LF,LF,LF
DEFB ' Note. "^" is 5Eh.',CR,LF
DEFB LF,' "B" - PREVIOUS PAGE "ESC" - MENU',CR,LF
DEFB ' ANY OTHER KEY - NEXT PAGE','$'

```

```

HELP6: DEFB ' PRINTING',CR,LF,' =====',CR,LF,LF
DEFB ' The Print option prompts for a filename, the',CR,LF
DEFB ' drive letter is optional',CR,LF,LF,' [DRV:] FILENAME.FILETYPE',CR,LF,
LF
DEFB ' Carriage return will start the print output.',CR,LF
DEFB ' The program gives messages to indicate the',CR,LF
DEFB ' print status;',CR,LF,LF
DEFB ' FILE NOT FOUND - file not on specified disc',CR,LF
DEFB ' or error in filename.',CR,LF
DEFB ' SENDING TO PRINTER - outputting data',CR,LF
DEFB ' TRANSFER FINISHED - file sent to printer',CR,LF
DEFB LF,LF,LF,' "B" - PREVIOUS PAGE "ESC" - MENU',CR,LF
DEFB ' ANY OTHER KEY - NEXT PAGE','$'

```

```

HELP7: DEFB ' CUSTOMISING',CR,LF,' =====',CR,LF,LF
DEFB ' DEV - 00h to 03h TBRD - 00h to FFh',CR,LF
DEFB ' (00=50, 11=75, FF=19.2k)',CR,LF,LF
DEFB ' PROT - R=RTS, D=DTR, X=XON, E=ETX',CR,LF,LF,LF
DEFB ' RECEIVE ENABLE - WR3 bit 0 (REG3+1)',CR,LF
DEFB ' WORD LENGTH (Rx) - WR3 bits 6 and 7 (REG3+1)',CR,LF
DEFB ' PARITY - WR4 bits 0 and 1 (REG4+1)',CR,LF
DEFB ' STOP BITS - WR4 bits 2 and 3 (REG4+1)',CR,LF
DEFB ' RTS and DTR - WR5 bits 1 and 7 (REG5+1)',CR,LF
DEFB ' TRANSMIT ENABLE - WR5 bits 3 (REG5+1)',CR,LF
DEFB ' WORD LENGTH (Tx) - WR5 bits 5 and 6 (REG5+1)',CR,LF,LF
DEFB ' More on next page.',CR,LF
DEFB LF,' "B" - PREVIOUS PAGE "ESC" - MENU',CR,LF
DEFB ' ANY OTHER KEY - NEXT PAGE','$'

```

```

HELP8: DEFB ' SYSTEM VARIABLES',CR,LF,' =====',CR,LF,LF
DEFB ' 1. Base Port (PORTSET+1)',CR,LF
DEFB ' First port used on QS-1',CR,LF,LF
DEFB ' 2. Base CARD (CARDSET+1)',CR,LF
DEFB ' Card number 00h to 1Fh',CR,LF,LF,LF,LF,LF,LF,LF,LF,LF,LF,LF
DEFB ' More on next page.',CR,LF
DEFB LF,' "B" - PREVIOUS PAGE "ESC" - MENU',CR,LF
DEFB ' ANY OTHER KEY - NEXT PAGE','$'

```

```

HELP9: DEFB ' 4. Defaults - Device (DEF+1)',CR,LF,LF
DEFB ' DART (DRT+1)',CR,LF
DEFB ' (D0) for Ch 0',CR,LF
DEFB ' (D1) for Ch 1',CR,LF,LF
DEFB ' 8116 (BRD+1)',CR,LF
DEFB ' (B0) for Ch 0',CR,LF
DEFB ' (B1) for Ch 1',CR,LF,LF
DEFB ' Ctrl port (PRT+1)',CR,LF
DEFB ' (P1) for Ch 0',CR,LF

```

```

DEFB ' (P3) for Ch 1',CR,LF,LF
DEFB ' Baud rate (BRT+1)',CR,LF,LF
DEFB ' Protocol (PRO+1)',CR,LF,LF
DEFB ' More on next page.',CR,LF
DEFB LF,' "B" - PREVIOUS PAGE "ESC" - MENU',CR,LF
DEFB ' ANY OTHER KEY - NEXT PAGE','$'

```

```

HELPA: DEFB CR,LF
DEFB ' 5. Printer ctrl codes ',CR,LF,LF
DEFB ' Memory location given is first address of a string.',CR,LF
DEFB ' eg. 1B0F is stored as - 1Bh 0Fh 23h 23h',CR,LF
DEFB ' Do not remove the final 23h this is the end marker',CR,LF,LF
DEFB ' compressed mode ON (CPE)',CR,LF
DEFB ' OFF (CPR)',CR,LF,LF
DEFB ' double width mode ON (CPQ)',CR,LF
DEFB ' OFF (CPW)',CR,LF,LF
DEFB ' near letter quality ON (CPA)',CR,LF
DEFB ' OFF (CPN)',CR,LF,LF
DEFB ' underlining mode ON (CPS)',CR,LF
DEFB ' OFF (CPT)',CR,LF,LF
DEFB LF,' "B" - PREVIOUS PAGE "ESC" - MENU',CR,LF
DEFB ' ANY OTHER KEY - NEXT PAGE','$'

```

ORG 2900H

```
PCON: DEFB LF,LF,LF,LF,LF,' DEVICE = PRINTER ',CR,LF,LF
```

```
PBRD: DEFB ' SELECTED BAUD RATE ','$'
```

```
PCBD: DEFB '50 ','$','75 ','$','110 ','$','134 ','$'
DEFB '150 ','$','300 ','$','600 ','$','1200 ','$'
DEFB '1800 ','$','2000 ','$','2400 ','$','3600 ','$'
DEFB '4800 ','$','7200 ','$','9600 ','$','19200 ','$'

```

```
PCEND: DEFB LF,LF,CR,' 8 DATA BITS',LF,LF,CR
DEFB ' 1 STOP BIT',LF,LF,CR
DEFB ' NO PARITY',LF,LF,CR,LF,LF,LF,LF
DEFB ' ANY KEY ','$'

```

```

CPE: DEFB 1Bh,0Fh,'#','#'; COMPRESSED
CPR: DEFB 12h,'#','#','#'; RELEASE PE
CPQ: DEFB 1Bh,57h,01h,'#'; DOUBLE WIDTH
CPW: DEFB 1Bh,57h,00h,'#'; RELEASE PQ
CPA: DEFB 1Bh,6Eh,'#','#'; NLQ
CPN: DEFB 1Bh,50h,'#','#'; RELEASE NLQ
CPS: DEFB 1Bh,2Dh,01h,'#'; UNDERLINE
CPT: DEFB 1Bh,2Dh,00h,'#'; NO UNDERLINE

```

```

IPSTR: DEFB '#####'
DEFB '#####'; INPUT STRING FOR CODE
DEFB '&' ; TERMINATOR

```

```

ESCSTR: DEFB '#####'; PRINTER SETUP STRING
DEFB '#' ; TERMINATOR

```

```

STAKSIZ: DEFS 20 ; STACK SIZE
STACK: DEFS 20

```

```
P0: DEFS 1 ; DATA CHANNEL A
```

```

P1:      DEFS 1      ; CTRL CHANNEL A
P2:      DEFS 1      ; DATA CHANNEL B
P3:      DEFS 1      ; CTRL CHANNEL B
P7:      DEFS 1      ; CONTROL PORT
D0:      DEFS 1      ; DART 0
D1:      DEFS 1      ; DART 1
B0:      DEFS 1      ; BAUD 0
B1:      DEFS 1      ; BAUD 1
DEV:     DEFS 1      ; DEVICE 0 - 3
CHAB:    DEFS 1      ; CHANNEL A OR B
TBRD:    DEFS 1      ; TX BAUD RATE
DBRD:    DEFS 1      ; BAUD RATE TO DISPLAY
DART:    DEFS 1      ; DART IN USE
BAUD:    DEFS 1      ; 8116 IN USE
PROT:    DEFS 1      ; PROTOCOL TO USE
CODE:    DEFS 1      ; PRINTER SETUP Y/N
ESC1:    DEFS 1      ; CODE TEMP STORAGE 1
ESC2:    DEFS 1      ; CODE TEMP STORAGE 2
TEMP:    DEFS 1      ; TEMPORARY STORAGE
MORE:    DEFS 1      ; MORE FILE ?
LOOP:    DEFS 1      ; DO LOOP ?

```

```

ORG 2800h

```

```

BUFF:    DEFS 1

```

```

SIZE:    EQU  BUFFSIZ*1024
BUFFEND: EQU  BUFF+SIZE

```

```

END

```

```

; COPYRIGHT J.W.BOWES 1988

```

```

A>

```